CONNECTICUT RIVER FLOOD CONTROL

OPERATION AND MAINTENANCE MANUAL

FOR

FLOOD PROTECTIVE WORKS

WINSTED, CONN.

COMPLETED PROJECT FROM STERLING PLACE

CORPS OF ENGINEERS, U. S. ARMY

OFFICE OF THE DIVISION ENGINEER

NEW ENGLAND DIVISION, BOSTON, MASSACHUSETTS

JUNE 1953

OPERATION AND MAINTENANCE MANUAL

FOR

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AT

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Corps of Engineers
U. S. Army
Office of the Division Engineer
New England Division
Boston, Massachusetts

June 1953

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SECTION I - INTRODUCTION

1-01. Authorization. - Construction of the Mad River Channel Improvement at Winsted, Connecticut, was authorized by the Flood Control Act approved August 18, 1941 (Public Law 228, 77th Congress, 1st session).

1-02. Location. - The project is located in the Connecticut River watershed, on the Mad River in the City of Winsted (Town of Winchester), Connecticut.

1-03. Description of Project. - The project consists of an enlarged and improved channel from the Lake Street Bridge to a point approximately 1700 feet below the Case Avenue Bridge, a distance of 4890 feet. Also included were the removal of the abandoned dam of the New England Knitting Co., replacement of one pier under the warehouse of the Manchester Grain Mills, Inc., and strengthening of the foundation of the Winsted Motor Sales Garage.

1-04. Protection Provided. - The area protected includes the principal shopping center of Winsted. The construction provides complete pro-

tection to the area from a stream flow of 5,000 c.f.s. which is approximately 50% larger than the peak of the flood of record, September 1938. Extremely rare floods of even greater magnitude will be reduced in stage but will not be completely controlled.

1-05. Construction History. - Construction was initiated in March 1950 by J.P. Dugan and Son, Inc., who constructed approximately 10% of the project. The remaining 90% was constructed by Gencarelli, Inc., who completed the project in October 1951.

1-06. Plans. - A set of plans showing the project as designed and as actually constructed is included in Appendix D.

SECTION II - LOCAL COOPERATION REQUIREMENTS

2-01. Flood Control Acts. - Section 3 of the Flood Control Act approved June 22, 1936 (Public No. 738, 74th Congress) provides, "That hereafter no money appropriated under authority of this Act shall be expended on the construction of any project until States, political subdivisions thereof, or other responsible local agencies have given assurances satisfactory to the Secretary of War that they will:

> "(a) Provide without cost to the United States all lands, easement, and rights-of-way necessary for the construction of the project;
>
> "(b) Hold and save the United States free from damages due to the construction works, and;
>
> "(c) Maintain and operate all the works after completion in accordance with regulations prescribed by the Secretary of War."

2-02. Assurances. - The Town of Winchester in a Special Town Meeting April 8, 1946, authorized the Selectmen to give assurances as described in paragraph 2-01 on behalf of the Town. Authority for the Town to enter into such agreements with the United States is contained in Senate Bill No. 17, enacted by the Connecticut General Assembly and approved by Governor Raymond E. Baldwin on May 22, 1946. The assurances, signed by Selectmen

P. Francis Hicks, William M. Newett, Joseph J. Vincent, Joseph W. Darcy and Howard M. Denning signed on January 31, 1949, were forwarded to the Chief of Engineers on March 8, 1949. Copies of the official record of the town meeting and the assurances of local cooperation by the Selectmen are given in Appendix B of this Manual.

SECTION III - GENERAL PROCEDURES

3-01. Purpose of this Manual. - The purpose of this Manual is to present detailed information to be used as a guide in complying with "Flood Control Regulations - Maintenance and Operation of Flood Control Works" as approved by the Acting Secretary of War on 9 August 1944, and published in the Federal Register on 17 August 1944, a copy of which is bound in the back of this volume as Appendix A. In executing assurances of local cooperation for the Winsted Project, the Town of Winchester has agreed to maintain and operate the completed works in accordance with those regulations. The regulations are intended to cover all local protection projects constructed by the Department throughout the United States, are general in nature, and obviously cannot give detailed instructions for the maintenance and operation of a specific project. The details set forth in this Manual for maintenance and operation of the Winsted project are intended to supplement the regulations to permit obtaining all the benefits and protection against floods for which the project was designed. Failure to maintain and operate the project as required by the regulations and as

detailed herein can cause severe property losses and loss of life and can result in an irreparable loss of confidence in the flood protection system by citizens who have invested their funds on the basis of the protection which it provides.

3-02. General Rules and Regulations. - The applicable general rules in the regulations prescribed by the Secretary of War are in quotation marks below and are defined further by remarks under each quotation. Wherever in these regulations reference is made to the War Department, it shall mean the Department of the Army and where reference is made to the District Engineer, it shall mean the Division Engineer, New England Division, Boston, Mass.

> "(1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits."

(a) These requirements cannot be overstressed, and the town authorities must make adequate provisions for funds, personnel, equipment, and materials to allow for the proper maintenance and operation of the flood protection works.

> "(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of War, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the 'Superintendent,' who shall be responsible for the development

and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States."

(a) The committee should be composed of competent members, preferably men experienced in engineering or construction work of a nature similar to the flood protection works. The committee must be given broad authority to carry out its responsibilities. The name, address, and office and home telephone numbers of the Superintendent, and any changes thereof, shall be promptly furnished the Division Engineer.

"(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times."

(a) A truck crane or other type of mobile derrick should be available for the removal of debris which may clog the channel. Approximately 1,000 sand bags and tools such as picks and shovels for 10 men should be obtained and held in reserve to meet any ordinary emergency that may occur during flood periods. Borrow pits for embankment materials should be secured and sources of where to obtain additional supplies of materials, tools, and equipment should be well established in order that these articles can be obtained quickly in case of an emergency. Short sand bag dikes may be necessary to increase the protection provided by the improved channel during rare floods.

"(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities."

(a) The disposal of rubbish, erection of fences, or barriers, or any form of trespassing on the project shall be prohibited. The town has enacted a law making the disposal of rubbish in the channel subject to a fine of $100.00. It will be less expensive for the town to strictly enforce this law than frequently remove rubbish from the channel.

"(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way.

nor shall any change be made in any feature of the works without prior determination by the District Engineer of the War Department or his authorized representative that such improvement, excavation, construction, or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work."

(a) Any contemplated improvements or alterations as outlined above must be submitted to the Corps of Engineers, Boston, Mass., and the approval of the Division Engineer obtained prior to the authorization of the work by the town. All requests for approval shall be in writing and complete drawings in duplicate, one set of which shall be in reproducible form must be submitted along with a full description of the work intended. The town will be held responsible for obtaining prior approval from the Corps of Engineers for any improvements or alterations proposed by itself, private parties or any public parties. The town shall furnish the Division Engineer as-built drawings in duplicate of the completed work.

"(6) It shall be the duty of the superintendent to submit a semi-annual report to the District Engineer covering inspection, maintenance, and operation of the protective works."

(a) See paragraph 3-04 of this Manual for instructions on submitting reports.

"(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works."

(a) The Division Engineer or his representatives will make periodic inspections of the protective works to determine if the project is being maintained by the town.

"(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made."

(a) The town should maintain the facilities and keep them in good repair and not wait for the Division Engineer to call such matters to its attention. Upon request, the Division Office will advise the town how to make any major repairs to the facilities.

"(9) ----------Not applicable----------"

"(10) The War Department will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations."

(a) The flood control committee should familiarize itself with the contents of the Manual. The town authorities are encouraged to call on the Division Office of the Corps of Engineers for any additional advice or instructions required by them in carrying out the town's obligations for maintaining and operating the flood protection facilities.

3-03. Maintenance. - a. Maintenance in this Manual refers to the care and upkeep of the completed construction work which was turned over to the town. The Department of the Army, through its Division Engineer, endeavored to design the safest system possible, and to see that it was well constructed. If the work is neglected, there will be deterioration and possible failure in flood time when there is dire need of dependable protection.

b. The organization which is responsible for maintenance should always give thought to what it will do when the need arises to operate.

From experience gained through maintaining the different parts of the system, it will be in a position to use them effectively in time of stress.

c. Maintenance involves regular inspection of the entire system. The purpose of the inspection is to detect any deterioration or faulty operation that needs repair.

d. Other features that should be watched are discussed in Section IV.

3-04. Reports. - a. The regulations prescribed by the Secretary of War call for semi-annual reports to be submitted by the Superintendent to the Division Engineer, covering inspection and maintenance. Inspection of the flood protective facilities shall be made immediately prior to flood seasons, immediately following floods, and otherwise at intervals not exceeding 90 days as required by the regulations. Spring is the season in which the majority of floods have occurred; however, floods can occur in any month of the year.

b. To assist the superintendent in making his inspections and reports, a sample form has been prepared and is included in Appendix C.

The superintendent shall have additional copies printed for use in submitting his reports.

c. The semi-annual reports should be submitted in triplicate to the Division Engineer each February and August. The reports will be submitted in letter form with copies of the inspection forms covering the inspections made during the period of the report. The reports shall cover the following points:

(1) A description of the maintenance work performed in the preceding six months.

(2) The number and classification of men working on maintenance, and the number of hours worked.

(3) Description of any work performed by contract on the repair or improvement of the project.

(4) A record of high water periods since the last report.

(5) Suggestions relative to public cooperation and comments concerning public sentiment on the protection obtained are considered pertinent and desirable data for inclusion in the report, but such data are not required.

SECTION IV - CHANNEL OPERATION AND MAINTENANCE

4-01. Description. - The channel construction by the Corps of Engineers consisted of deepening the Mad River from Lake Street Bridge to a point 1700 feet below Case Avenue Bridge. All materials in the riverbed were excavated to provide a trapezoidal channel of varying widths and grades. To prevent erosion, a rock filled blanket was placed on all excavated areas except where ledge rock occurred and in the downstream reaches where velocities are lower. Under the warehouse of the Manchester Grain Mill, Inc. (Station 17 + 50) one of the piers was replaced, extending it below the improved grade. The foundations of the Winsted Motor Sales building were extended to bedrock. The abandoned dam of the New England Knitting Company (Station 22 + 25) was removed.

4-02. Maintenance. - a. The regulations prescribed by the Secretary of War under paragraph 208.10 also give rules for the maintenance of channels and floodways. These rules are quoted here to avoid cross references to the regulations. Brief comments on the particular applicability of these rules to the Winsted project follow each quotation.

"Channels and floodways. - (1) Maintenance. Periodic inspections of improved channels and floodways shall be made by the superintendent to be certain that:

"(i) The channel or floodway is clear of debris, weeds, and wild growth."

"(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments."

"(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals."

"(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred."

"(v) Riprap sections and deflection dikes and walls are in good condition."

"(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works."

(a) In order for the channel to function properly during flood periods, it must be kept free of all types of obstructions. Logs, trees, or debris which float into the improved reach of the river shall be removed as soon as possible. The dumping of wastes and rubbish into the channel and encroachment of the channel by structures shall be prohibited and any such obstructions promptly removed. Growths which tend to restrict the channel shall be removed. This cannot be overstressed. Small brush soon grows into serious snags and constrictions. However, where no dumped rock blanket exists care shall be exercised not to disturb grass or vegetation required to stabilize the banks of the channel. The formation of shoals will be apparent during periods of low flow. Care should be exercised in their removal that slopes of the channel and existing banks are not undercut.

The approach to the improved reach shall be inspected and logs, trees, and other obstructions which would be washed into the improved channel shall be removed.

It is also imperative that the sides and the bottom of the channel be maintained in good repair. A failure of the sides could endanger bridges, retaining walls or structures along the banks. Wherever scour-

ing or sloughing has displaced sections of dumped rock or earth banks they should be repaired promptly using materials similar to those displaced.

The backwater area downstream from the Case Avenue Bridge must be maintained in such condition that natural backwater will not extend further upstream into the project.

> "Such inspection shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary."

4-03. Operation. - The regulations prescribed by the Secretary of War under paragraph 208.10 (g) (2) give rules for operation of channels and floodways. These rules, quoted here to avoid cross reference, are self-explanatory and require no amplification with regard to the Winsted project.

> "(2) Operation. - Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired."

4-04. Emergency Repair Measures. - a. Scours. - Careful watch should be maintained over side slopes of the channel where scouring is likely to occur such as slopes not protected by riprap, or where it is subject to heavy currents. If any indication of scouring is observed, soundings should be taken to observe the amount and progress of the scour. Sandbagging or dumped rock will generally afford the most practical means of combatting this condition. The open ends of sand bags so used must be sewed or tied after filling with earth.

b. Raising Protected Grades. - During rare floods it may be necessary to raise the flood protection using short dikes at critical locations. One such location will probably be just above the garage of the Winsted Motor Sales Co.

(1) Sandbag Dike. - The sack ordinarily used for emergency dikes is a grain or feed sack which holds 100 pounds of grain. Smaller sacks may be used if feed sacks are not available. Grain sacks filled with about one cubic foot of earth, weighing about 100 pounds, will provide a unit about six inches high, one foot wide and two feet in length.

The sacks may be filled at the source of material and hauled to the site or filled from stockpile at the site, conditions determining the method employed. The same is true of filling; i.e., whether power or hand methods are used.

The open end of the sacks should always face upstream or toward the riverside of the dike and need not be sewed or tied. When the sack faces the river the loose end should be folded under and when facing upstream the loose end covered by the succeeding sack.

The front line of sandbags in the first layer should be laid parallel to the dike centerline and remaining bags at right angles to the centerline. The sandbags in the second layer are all laid at right angles to the centerline, the third row similar to the first, etc., as shown on Plate No. 1A, Appendix D. All sacks should be lapped about 1/3 each way and well mauled or tramped into place. The sacks should be filled to 2/3 their capacity when flattened out to facilitate proper placing and prevent bursting the sack when mauled or tramped into place.

Plate No. 1 illustrates the progressive method of increasing the dike

height and gives an approximation of the number of sacks required for dikes of various heights.

A crew of 50 mean should fill, carry and place approximately 1500 sacks per eight-hour day, all hand labor, when the source of material is within 150 feet of the point of placement. Production will depend on conditions at the site.

(2) Lumber and Sandbag Dike is the most satisfactory method of raising low reaches in emergencies. The chief objection is the time required to install. In placing this dike, as well as any other dike, a careful line of levels should be run and grade stakes set in advance unless the ground follows a dependable grade-line. Two-by-four or two-by-six inch stakes should then be driven on the riverside of the dike six feet apart and one-by-twelve inch boards nailed to landslide of the stakes. This wall, backed with a single tier of sandbags, will hold out at least one foot of water. If the second foot is necessary, the layers of bags will have to be increased in number and reinforced. Sandbags are laid substantially in the manner described in (1) above. The stakes should be driven at least

three feet into the ground, leaving at least three feet out, which will, in extreme cases, increase the protection by three feet if properly braced behind with sandbags. (See Plate II, Appendix D).

SECTION V - DRAWINGS AND SPECIFICATIONS

5-01. Drawings and Specifications. - A complete set of plans and specifications were furnished the Town of Winchester at the time of the construction of the project. A set of full-size plans showing the project as actually constructed was furnished the town at the time of transmittal of this Manual. Reduced prints of these drawings are included in Appendix D.

A P P E N D I X A

REGULATIONS PRESCRIBED

by the

SECRETARY OF WAR

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter II—Corps of Engineers, War Department

PART 208—FLOOD CONTROL REGULATIONS

MAINTENANCE AND OPERATION OF FLOOD CONTROL WORKS

Pursuant to the provisions of section 3 of the Act of Congress approved June 22, 1936, as amended and supplemented (49 Stat. 1571; 50 Stat. 877; and 55 Stat. 638; 33 U. S. C. 701c; 701c-1), the following regulations are hereby prescribed to govern the maintenance and operation of flood control works:

§ 208.10 *Local flood protection works; maintenance and operation of structures and facilities*—(a) *General.* (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of War, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the War Department or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The War Department will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations.

(b) *Levees*—(1) *Maintenance.* The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;

(iii) No seepage, saturated areas, or sand boils are occurring;

(iv) The drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;

(v) Drains through the levees and gates on said drains are in good working condition;

(vi) No revetment work or riprap has been displaced, washed out, or removed;

(vii) No action is being taken, such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;

(viii) Access roads to and on the levee are being properly maintained;

(ix) Cattle guards and gates are in good condition;

(x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

(xi) There is no unauthorized grazing or vehicular traffic on the levees;

(xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days; and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation.* During flood periods the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee exist which may be overtopped;

(iv) No other conditions exist which might endanger the structure.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section.

(c) *Flood walls.*—(1) *Maintenance.* Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of trash and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged.

Such inspections shall be made immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation.* Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(d) *Drainage structures*—(1) *Maintenance.* Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on

drainage structures shall be examined, oiled, and trial operated at least once every 90 days. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

(iv) Erosion is not occurring adjacent to the structure which might endanger its water tightness or stability.

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(2) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse condition.

(e) *Closure structures*—(1) *Maintenance.* Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order,

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants*—(1) *Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, buildings, and equipment, repainting as necessary, and lubricating all machinery Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such tests. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on tests and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(g) *Channels and floodways* — (1) *Maintenance.* Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds, and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections and deflection dikes and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(h) *Miscellaneous facilities* — (1) *Maintenance.* Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior run-off during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(2) *Operation.* Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor. (49 Stat. 1571, 50 Stat. 877; and 55 Stat. 638; 33 U.S.C. 701c; 701c-1) (Regs. 9 August 1944, CE SPEWF)

[SEAL] J. A. ULIO,
Major General,
The Adjutant General.

[F. R. Doc. 44-12285; Filed, August 16, 1944; 9:44 a. m.]

A-2

drainage structures shall be examined, oiled, and trial operated at least once every 90 days. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

(iv) Erosion is not occurring adjacent to the structure which might endanger its water tightness or stability.

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(2) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse condition.

(e) *Closure structures*—(1) *Maintenance.* Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order,

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

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(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

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(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

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(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

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[SEAL] J. A. ULIO,
Major General,
The Adjutant General.

[F. R. Doc. 44–12285; Filed, August 16, 1944; 9:44 a. m.]

A P P E N D I X B

ASSURANCES

of

LOCAL COOPERATION

TOWN OF WINCHESTER, CONNECTICUT

SPECIAL TOWN MEETING

April 8, 1946

PURSUANT TO THE FOREGOING NOTICE AND WARNING A Special Town Meeting of the Legal Voters of the Town of Winchester was opened at the time and place therein specified.

Joseph W. Darcey, First Selectmen was ex-officio Moderator of said meeting and C. Wesley Winslow, Town Clerk was ex-officio Clerk of said meeting.

The call for the meeting was read by Mrs. Lillian E. Hutton, Assistant Town Clerk.

Upon motions duly made and seconded it was:

VOTED: That the proposed improvement of the channel of Mad River from Lake Street to a point approximately 1425 feet easterly of Case Avenue by the War Department of the United States, as appears on Maps dated Aug. 1944 file No. CT-10-1004 on file in office of Town Clerk be and it is hereby approved, such improvement being authorized for the protection of the Town by the Act of Congress of the United States on August 18th, 1941 (Public Law 228, 77th Congress, Chapter 377, First Session, and House Document 724, 76th Congress, Third Session); and that the Selectmen be and they are hereby authorized and empowered for and on behalf of the Town to procure all lands, easements and rights of way as may be necessary for the construction of said project and to perform all acts and to execute all instruments as may be required in connection therewith.

Upon motion, duly seconded the following resolution was adopted.

WHEREAS, the improvement of the Channel of the Mad River was authorized for the protection of the Town of Winchester and the City of Winsted by the Act of Congress on August 18, 1941 (Public Law 228-77th Congress, Chapter 377, First Session) and House Document 724, 76th Congress, Third Session, and,

WHEREAS, the voters of the Town of Winchester duly adopted a resolution at a Town Meeting held April 8th, 1946 authorizing the Board of Selectmen to give assurances to the Secretary of War;

NOW THEREFORE

IT IS ORDERED, that the Board of Selectmen be, and it is hereby authorized for and on behalf of the Town of Winchester to give assurances satisfactory to the Secretary of War that it will:

(a) Provide without cost to the United States all lands, easements and rights of way necessary for construction of the project.

(b) Bear the expense of local drainage works.

(c) Hold and save harmless the United States of America free from all claims for damages resulting from the improvement.

(d) Maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of War.

(NOTE: A copy of the last above resolution with the following attestation was furnished to the United States War Department.
"A True Copy of resolution on call of the roll of the Yeas and Nays, (Yeas 150 Nays none) at a meeting of the Voters of the Town of Winchester held on April 8, 1946.
Attest:- C. Wesley Winslow, Town Clerk."

The Meeting then adjourned:

Attest:- C. Wesley, Town Clerk

ASSURANCE OF THE TOWN OF WINCHESTER, CONNECTICUT

WHEREAS, the Congress of the United States, in House Document No.724, 76th Congress, 3d Session, proposed a project for construction of local protective works at Winsted, Connecticut, which project was authorized by the Flood Control Act approved August 18, 1941; and

WHEREAS, said project is subject to the provisions of Section 3 of the Flood Control Act of 1936 that no money appropriated under authority of said act shall be expended on the construction of any project until states, political subdivisions thereof, or other responsible local agencies have given assurances to the Secretary of the Army that they will (a) provide without cost to the United States, all lands, easements, and rights-of-way necessary for the construction of the project; (b) bear the expenses of local drainage works; (c) hold and save the United States free from claims for damages resulting from the Improvement, and (d) maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army; and

WHEREAS, the Congress has appropriated Federal funds for the initiation of the project; and,

WHEREAS, the said improvement is to be prosecuted under the direction of the Secretary of the Army and the supervision of the Chief of Engineers, Corps of Engineers, U.S. Army; and,

WHEREAS, by Senate Bill No. 17, entitled "An Act Concerning Harbor or River Improvements and Protection of Property Against Floods or Erosion", duly enacted by the Connecticut General Assembly and approved by Governor

Raymond E. Baldwin on May 22, 1946, any municipality, as defined by Section 376c of the 1935 Supplement to the General Statutes of Connecticut, by action of its legislative body, is authorized to negotiate, cooperate and enter into agreements with the United States and the State of Connecticut in order to satisfy, the conditions imposed by the United States in authorizing any project for the improvement of navigation of any harbor or river and for protection of property against damage by floods or by erosion, provided such project shall have been approved by the Governor; and such municipality is further authorized by said Act to acquire by condemnation any lands, easements, or rights-of-way required for any such improvement or protection project, and any municipality is authorized to make appropriations and to expend funds in the manner provided by law for any such improvement.

NOW THEREFORE, the Town of Winchester, a municipality as defined by Section 376c of the 1935 Supplement to the General Statutes of Connecticut, by action of its legislative body, as defined by Section 166e of the 1939 Supplement thereto, hereby assures the United States as follows:

a. To the extent that it may legally so do pursuant to Senate Bill No. 17, aforementioned, it will cooperate, negotiate and enter into any agreement with the United States and the State of Connecticut which may be deemed necessary to satisfy the conditions imposed by the United States in connection with said project.

b. It agrees to and will furnish free of cost to the United States, all lands, easements and rights-of-way necessary for the construction of the project.

c. It agrees to bear the expenses of local drainage works.

d. It agrees to hold and save the United States free from claims for damages resulting from the Improvement.

e. It agrees to maintain and operate all works after completion in accordance with regulations prescribed by the Secretary of the Army.

IN WITNESS WHEREOF, the Board of Selectmen of the said Town of Winchester, acting for and on behalf of the said Town of Winchester, have executed the within assurance and caused the corporate seal of said Town of Winchester to be affixed hereto this 31st day of January, 1949.

s/ P. Francis Hicks

William M. Hewett

Joseph J. Vincent

Joseph W. Darcey

Howard M. Deming

Selectmen of the Town of Winchester

Signed and sealed in presence of:

s/ C. Wesley Winslow

A P P E N D I X C

INSPECTION REPORT FORM

IMPROVED CHANNEL OF MAD RIVER
WINSTED, CONNECTICUT

INSPECTION REPORT

FOR PERIOD_____

1. Date inspected by Superintendent. _____

2. General condition of channel. _____

3. Has the capacity of the channel been reduced due to growth of vegetation, shoaling, or other encroachments? _____

4. Are dumped rock sections in good condition? _____

5. Describe deficiencies, including locations, and corrective measures planned. _____

_____

_____

_____

6. Have all deficiencies noted in previous Inspection Report been corrected? _____

7. Has any high water been experienced since the last Inspection Report? _____

If so, describe briefly, including dates, height of water, and effect on protective works. _____

_____

_____

_____

Submitted:
(Signed)_____
Superintendent

_____
(Date)

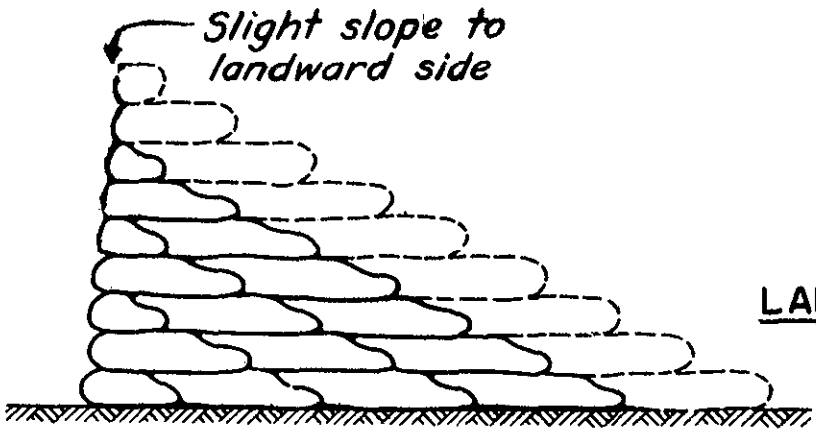
Appendix C

A P P E N D I X D

DRAWINGS

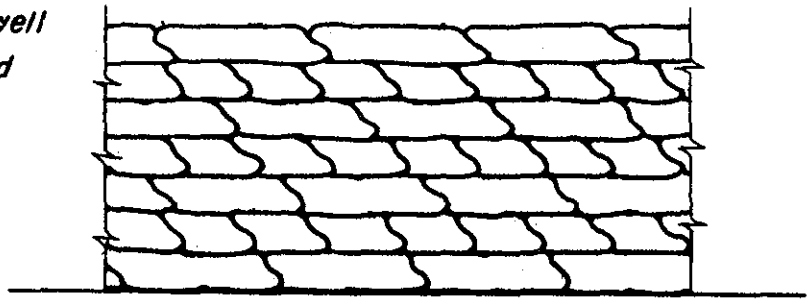
Title	Plate No.
STANDARD HIGH WATER MAINTENANCE METHODS	
Sack Dike or Topping	I
Model Sack Dike or Topping	I-A
Lumber and Sack Topping	II
PLANS AND CROSS SECTIONS	
Winsted Channel Improvement, Winsted, Conn.	
Project Location and Index Map	III
Plans and Profiles	IV to VII
Cross Sections	VIII

CORPS OF ENGINEERS. U. S. ARMY



SECTION

Note: Sacks should be lapped at least 1/3 all ways and well mauled or tamped into place.



RIVERSIDE ELEVATION

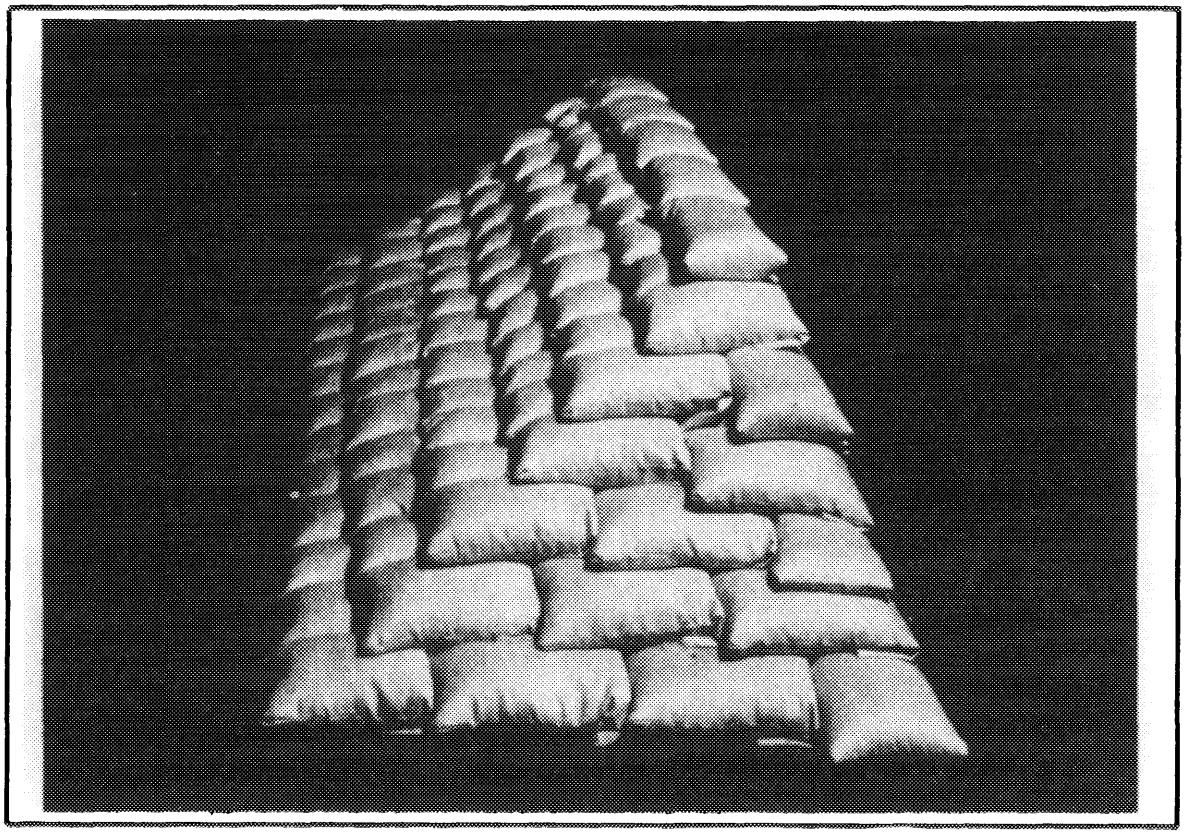
SACKS REQUIRED PER 100' STA.
100 lb. "Feed" Sacks - 1 Cu. Ft. Each

Approx. Hgt. Sack Dike	Sacks High	Required
1.5	3	300
2.0	4	750
3.0	6	1400
4.0	8	2250
5.0	10	3250
6.0	12	4500
7.0	14	5950
8.0	16	7600

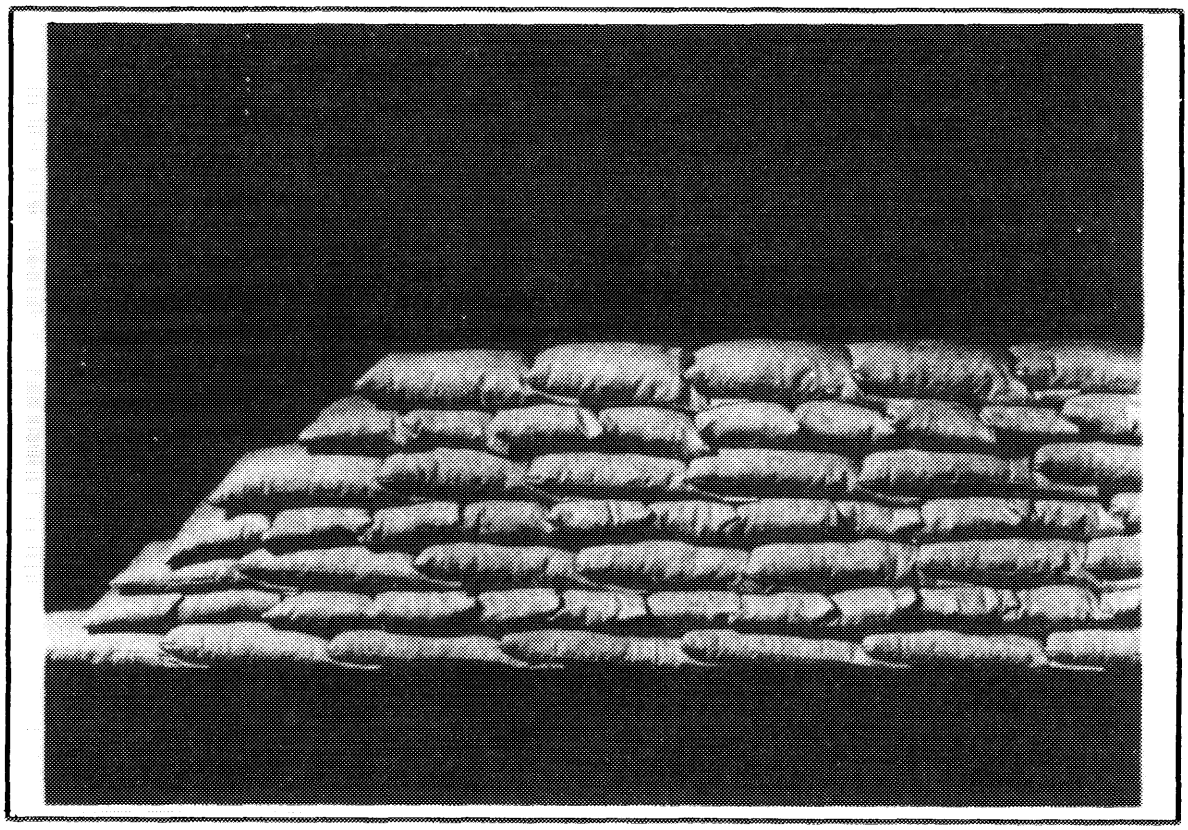
SACK DIKE OR TOPPING STANDARD HIGH WATER MAINTENANCE INSTRUCTION

PREPARED BY
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION, BOSTON, MASS.

PLATE NO. 1

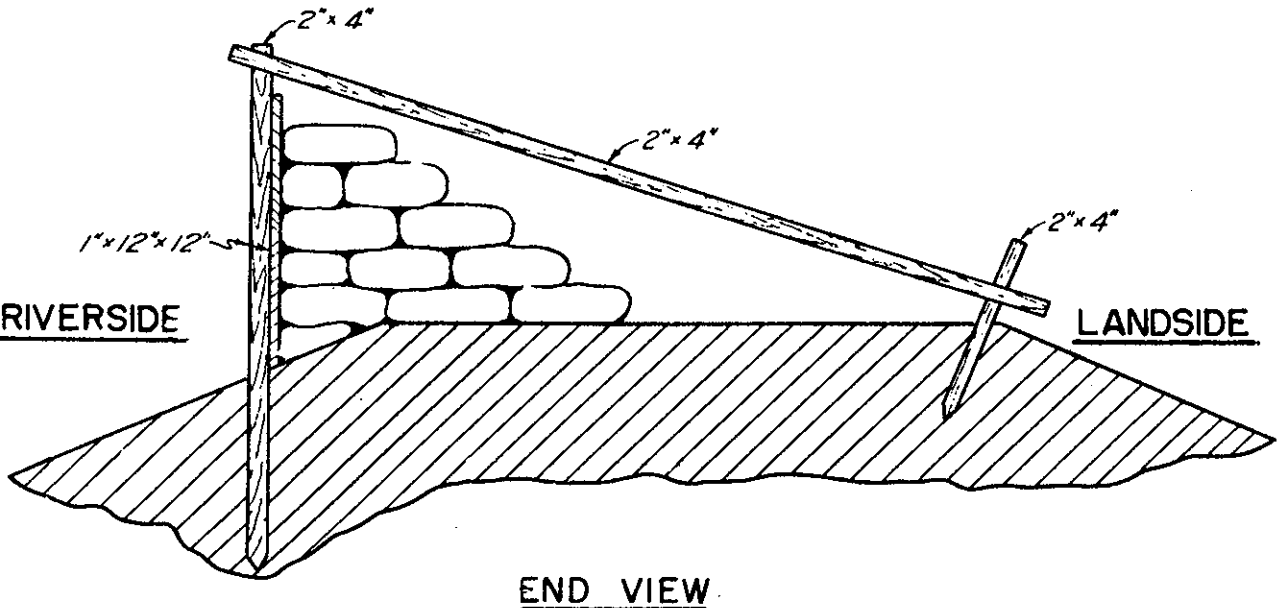


MODEL SACK DIKE OR TOPPING
Typical Section

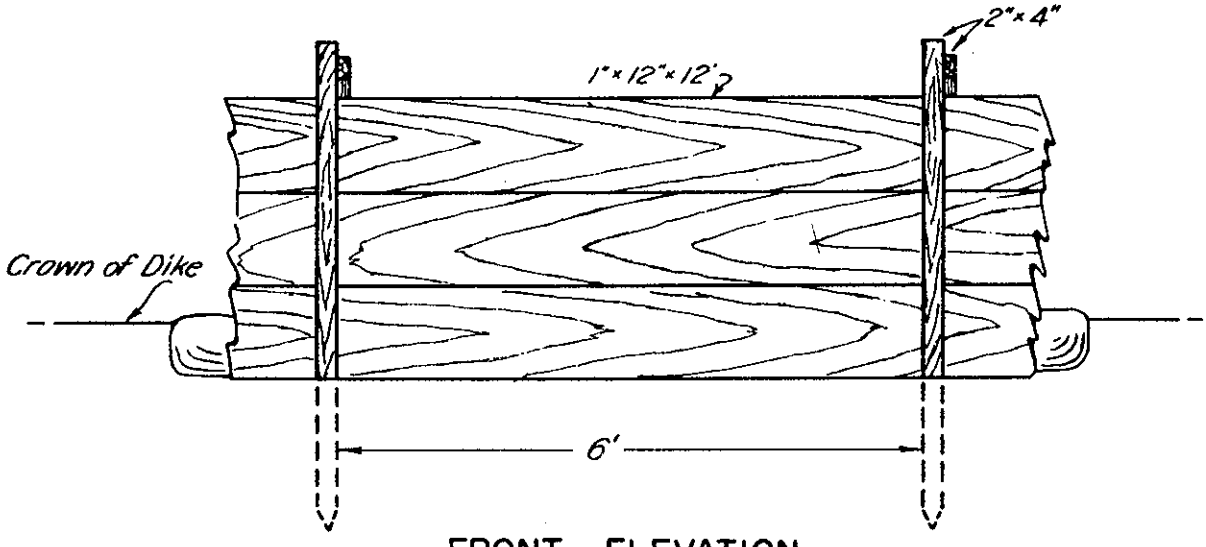


MODEL SACK DIKE OR TOPPING
Riverside View

PLATE NO. IA



END VIEW



FRONT ELEVATION

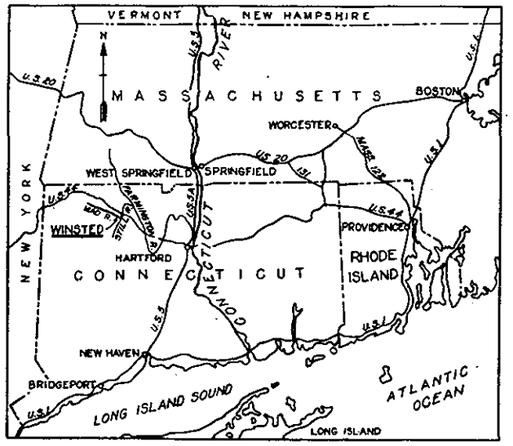
BILL OF MATERIAL TO CONSTRUCT 100 FEET

25 pcs. 1"x12"x12'	17 pcs. 2"x 4"x 6'
17 pcs. 2"x 4"x10'	17 pcs. 2"x 4"x 2'

LUMBER AND SACK TOPPING STANDARD HIGH WATER MAINTENANCE INSTRUCTION

PREPARED BY
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION, BOSTON, MASS.

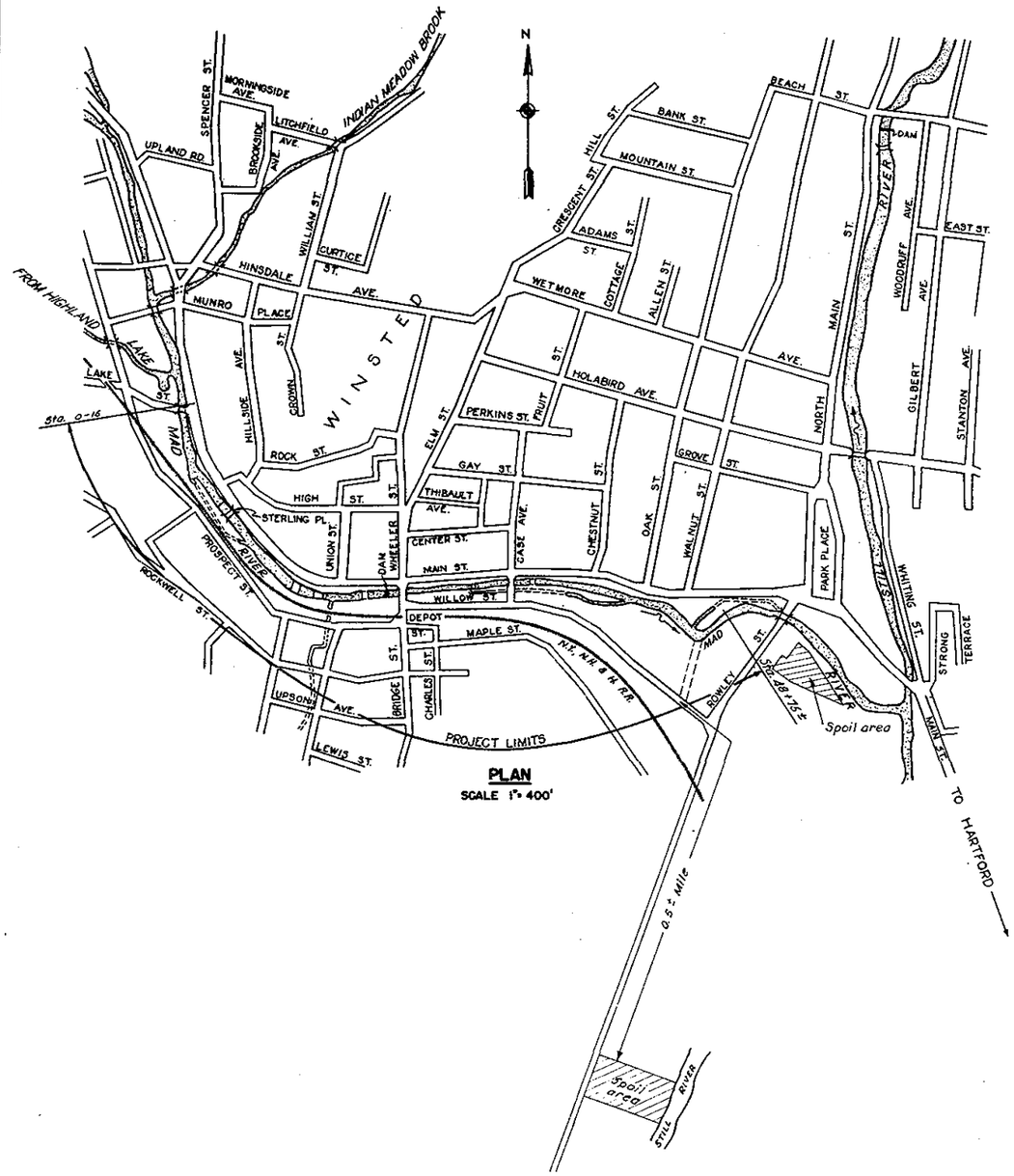
PLATE NO. 11



LOCATION MAP

SCALE IN MILES

0 10 20 30



PLAN

SCALE 1" = 400'

CONNECTICUT RIVER FLOOD CONTROL

CHANNEL IMPROVEMENT

WINSTED, CONNECTICUT

PROJECT LOCATION AND INDEX

MAD RIVER CONNECTICUT

SCALE: 1 IN. = 400 FT.

400' 0 400' 800'

OPERATION AND MAINTENANCE MANUAL

PREPARED BY

CORPS OF ENGINEERS, U. S. ARMY.

OFFICE OF THE DIVISION ENGINEER

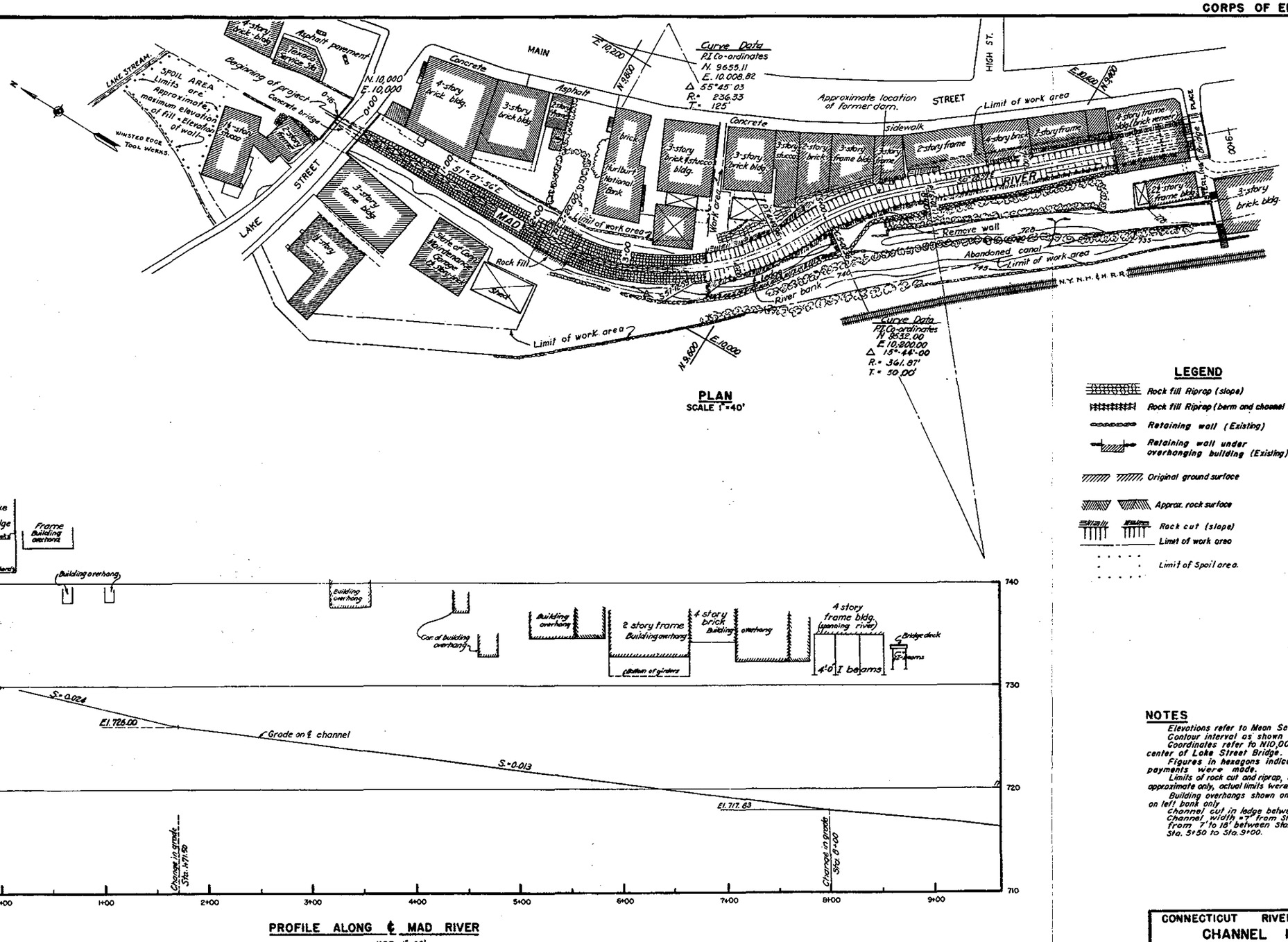
NEW ENGLAND DIVISION BOSTON, MASS.

JUNE 1953

PLATE NO. III

WAR DEPARTMENT

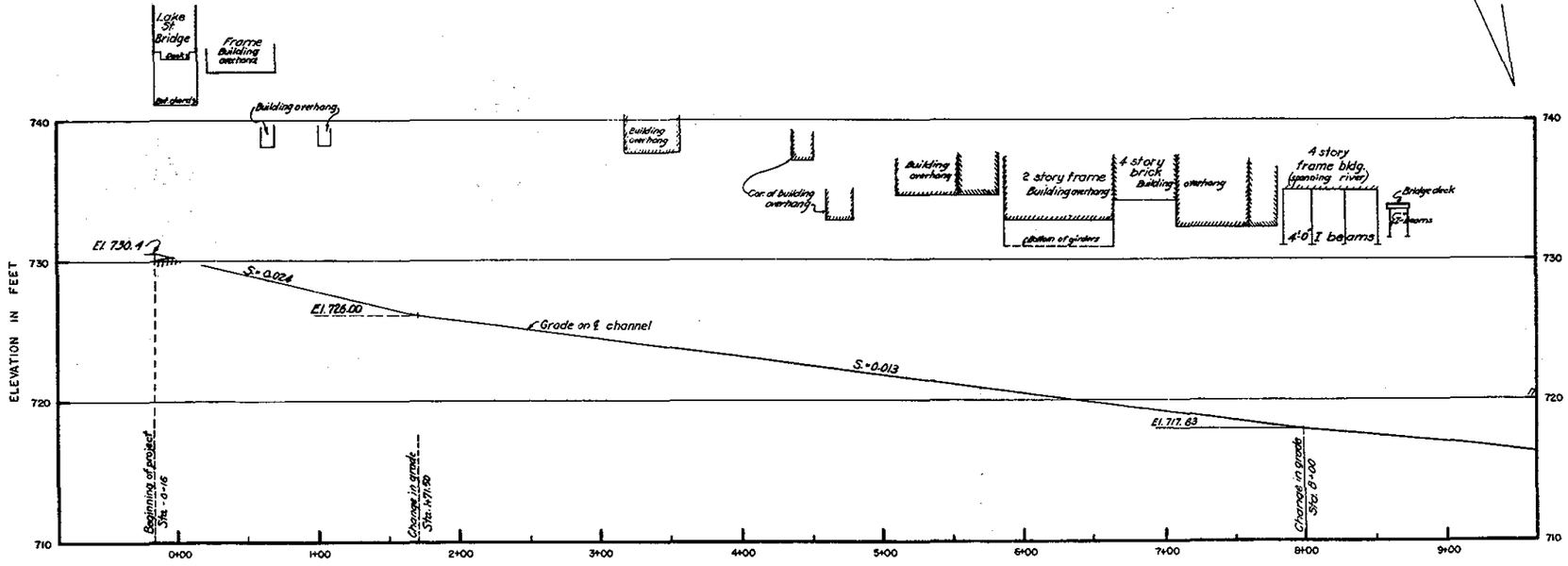
CORPS OF ENGINEERS, U. S. ARMY



PLAN
SCALE 1"=40'

LEGEND

- Rock fill Riprap (slope)
- Rock fill Riprap (berm and channel bottom)
- Retaining wall (Existing)
- Retaining wall under overhanging building (Existing)
- Original ground surface
- Approx. rock surface
- Rock cut (slope)
- Limit of work area
- Limit of Spoil area.



PROFILE ALONG ℄ MAD RIVER
SCALES: HOR. 1"=40'
VERT. 1"= 4'

NOTES

Elevations refer to Mean Sea Level Datum.
Contour interval as shown
Coordinates refer to N10,000, E10,000 at line point, center of Lake Street Bridge.
Figures in hexagons indicate item numbers under which payments were made.
Limits of rock cut and riprap, shown on Sheets 2,3,4,5 are approximate only, actual limits were determined at time of construction.
Building overhangs shown on profile drawing refer to those on left bank only
Channel cut in ledge between Sta. 3+50 and Sta. 9+00
Channel width =7' from Sta.0-16 to Sta.3+50 transition from 7' to 18' between Sta. 3+50 and Sta.3+50; 18' from Sta. 3+50 to Sta. 9+00.

CONNECTICUT RIVER FLOOD CONTROL

CHANNEL IMPROVEMENT
WINSTED, CONNECTICUT
PLAN AND PROFILE NO. I

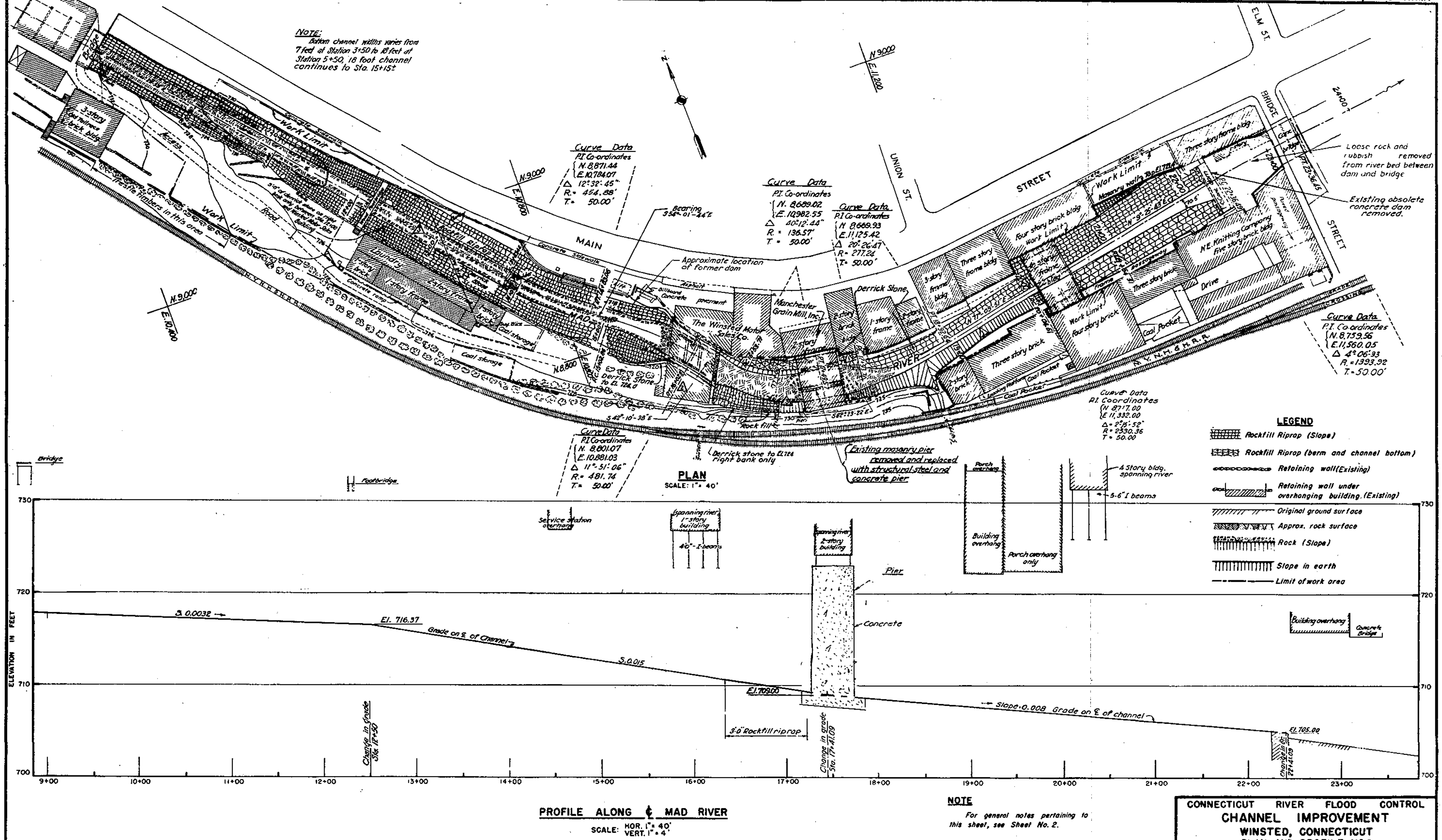
MAD RIVER CONNECTICUT

SCALE 1 IN.=40 FT.
40' 0 40' 80'

OPERATION AND MAINTENANCE MANUAL
PREPARED BY
CORPS OF ENGINEERS, U. S. ARMY.
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION BOSTON, MASS.

JUNE 1953

PLATE NO. IV


NOTE:
Bottom channel widths varies from 7 feet at Station 3+50 to 18 feet at Station 5+50, 18 foot channel continues to Sta. 15+15±
Curve Data
P.I. Co-ordinates
N. 8,871.44
E. 10,784.07
Δ 12°32'45"
R.= 454.88'
T.= 50.00'
Curve Data
P.I. Co-ordinates
N. 8,689.02
E. 10,982.55
Δ 40°12'44"
R. = 136.57'
T. = 50.00'
Curve Data
P.I. Co-ordinates
N 8,669.93
E. 11,125.42
Δ 20°26'47"
R.= 277.24
T.= 50.00'
Curve Data
P.I. Co-ordinates
N. 8,801.07
E. 10,881.03
Δ 11°-51'-06"
R.= 481.74
T.= 50.00'
Curve Data
P.I. Coordinates
N 8717.00
E 11,332.00
Δ = 2°15'-52"
R = 2530.36
T = 50.00
Curve Data
P.I. Co-ordinates
N. 8,759.56
E. 11,560.05
Δ 4°06'33
R. = 1393.92
T. = 50.00'
MAIN STREET
UNION ST.
ELM ST.
BRIDGE STREET
MAD RIVER
Work Limit
Access Road
Trestle timbers in this area
3-story Old Tailrace brick bldg.
Laundry
1-story frame
2-story frame
Coal storage
Concrete ramp
Concrete Sidewalk
Bearing S54°-01'-44"E
Approximate location of former dam
Billboard
Concrete pavement
Asphalt
The Winsted Motor Sales Co.
Manchester Grain Mill, Inc.
Derrick Stone
Derrick Stone to El. 724.0
Derrick stone to El.724 right bank only
S 42°-10'-38" E
Rock fill
Existing masonry pier removed and replaced with structural steel and concrete pier
Three story frame bldg
Four story brick bldg
Three story brick
Four story brick
Coal Pocket
Loading Platform
Drive
N.E. Knitting Company Five story brick bldg
Masonry walls Top El.718.4
Loose rock and rubbish removed from river bed between dam and bridge
Existing obsolete concrete dam removed.
PT. 23+36.45
N.Y., N.H. & H.R.R.
N. 9,000
E. 10,400
E. 10,800
E. 11,200
N. 8,800
24+00
LEGEND
Rockfill Riprap (Slope)
Rockfill Riprap (berm and channel bottom)
Retaining wall (Existing)
Retaining wall under overhanging building. (Existing)
Original ground surface
Approx. rock surface
Rock (Slope)
Slope in earth
Limit of work area
PLAN
SCALE: 1" = 40'
Bridge
Footbridge
Service station overhang
(spanning river) 1-story building
40" - I-beams
(spanning river) 2-story building
Pier
Concrete
Porch overhang
Building overhang
Porch overhang only
4 Story bldg. spanning river
5-6" I beams
Building overhang
Concrete Bridge
ELEVATION IN FEET
S. 0.0032
El. 716.37
Grade on ℄ of Channel
S. 0.015
El. 709.00
3'-0" Rockfill riprap
Change in grade Sta. 12+50
Change in grade Sta. 17+41.09
Slope 0.008 Grade on ℄ of channel
El. 705.00
Change in Grade 22+41.09
PROFILE ALONG ℄ MAD RIVER
SCALE: HOR. 1" = 40' VERT. 1" = 4'

NOTE

For general notes pertaining to this sheet, see Sheet No. 2.

CONNECTICUT RIVER FLOOD CONTROL

CHANNEL IMPROVEMENT

WINSTED, CONNECTICUT

PLAN AND PROFILE NO.2

MAD RIVER — CONNECTICUT

SCALE: 1 IN. = 40 FT.

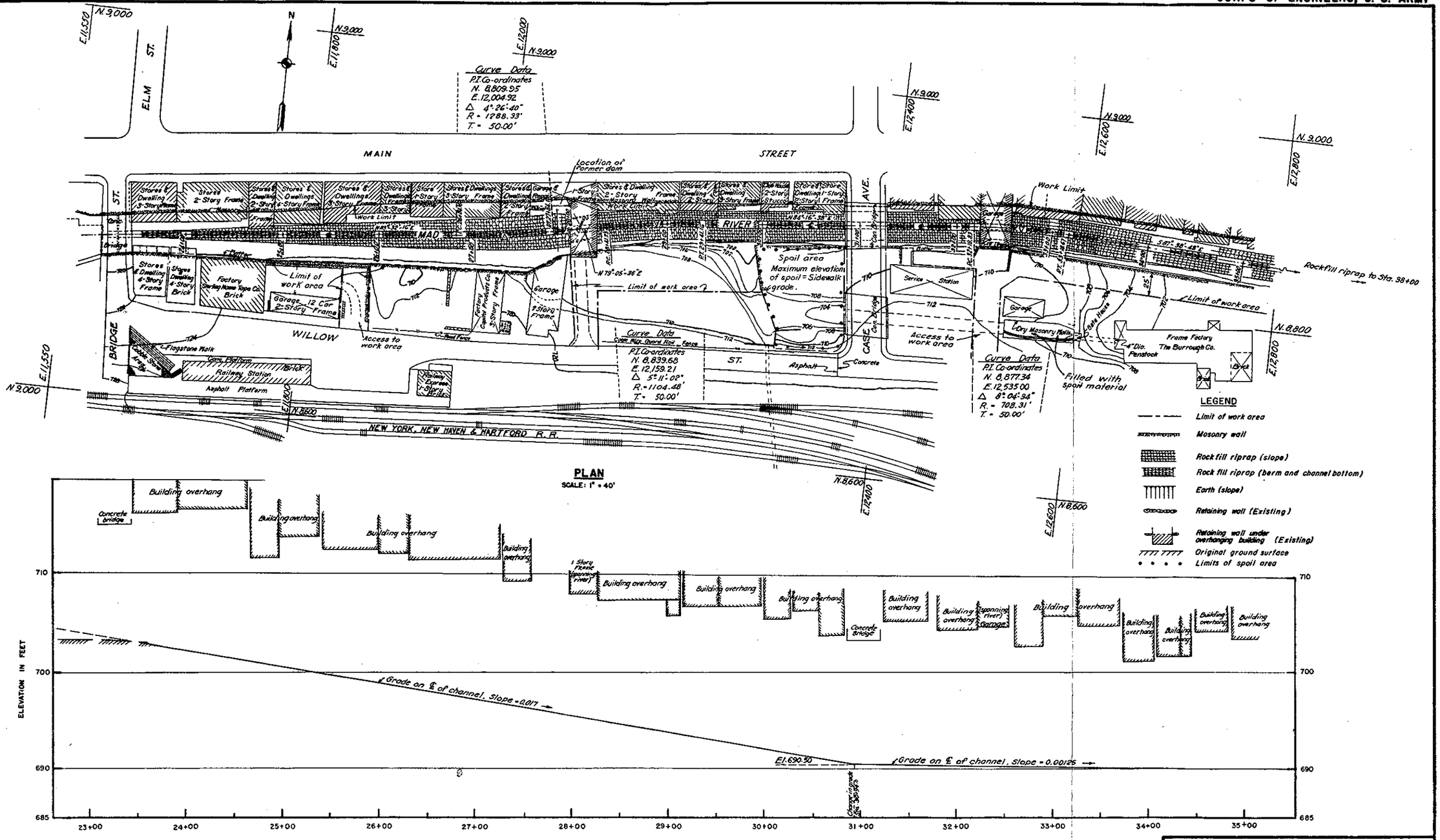
OPERATION AND MAINTENANCE MANUAL

PREPARED BY
CORPS OF ENGINEERS, U. S. ARMY.
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION BOSTON, MASS.

JUNE 1953

WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN
SCALE: 1" = 40'

PROFILE ALONG ℄ MAD RIVER
SCALES: HOR. 1" = 40'
VERT. 1" = 4'

LEGEND
- Limit of work area
- Masonry wall
- Rockfill riprap (slope)
- Rock fill riprap (berm and channel bottom)
- Earth (slope)
- Retaining wall (Existing)
- Retaining wall under overhanging building (Existing)
- 7777 7777 Original ground surface
- • • • • Limits of spoil area

NOTE
For general notes pertaining to this sheet, see Sheet No. 2.

CONNECTICUT RIVER FLOOD CONTROL
CHANNEL IMPROVEMENT
WINSTED, CONNECTICUT
PLAN AND PROFILE NO.3
MAD RIVER CONNECTICUT
SCALE: 1 IN = 40 FT
40' 0 40 80'

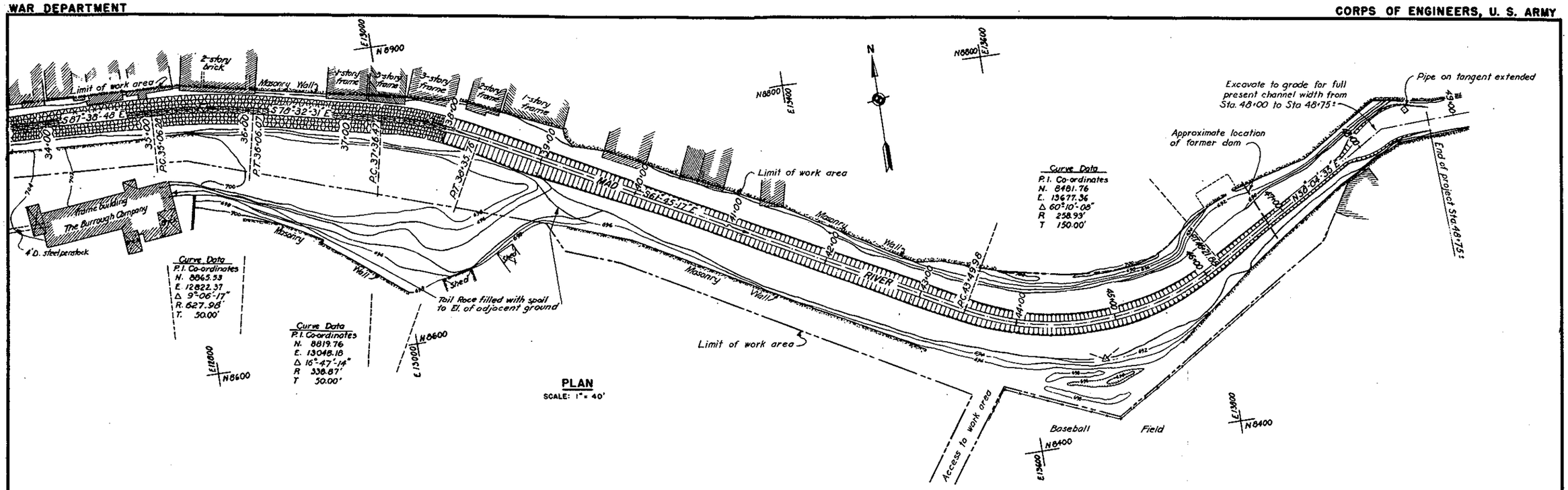
OPERATION AND MAINTENANCE MANUAL

PREPARED BY
CORPS OF ENGINEERS, U.S. ARMY
OFFICE OF THE DIVISION ENGINEER
NEW ENGLAND DIVISION, BOSTON, MASS.
JUNE 1953

PLATE NO. VI

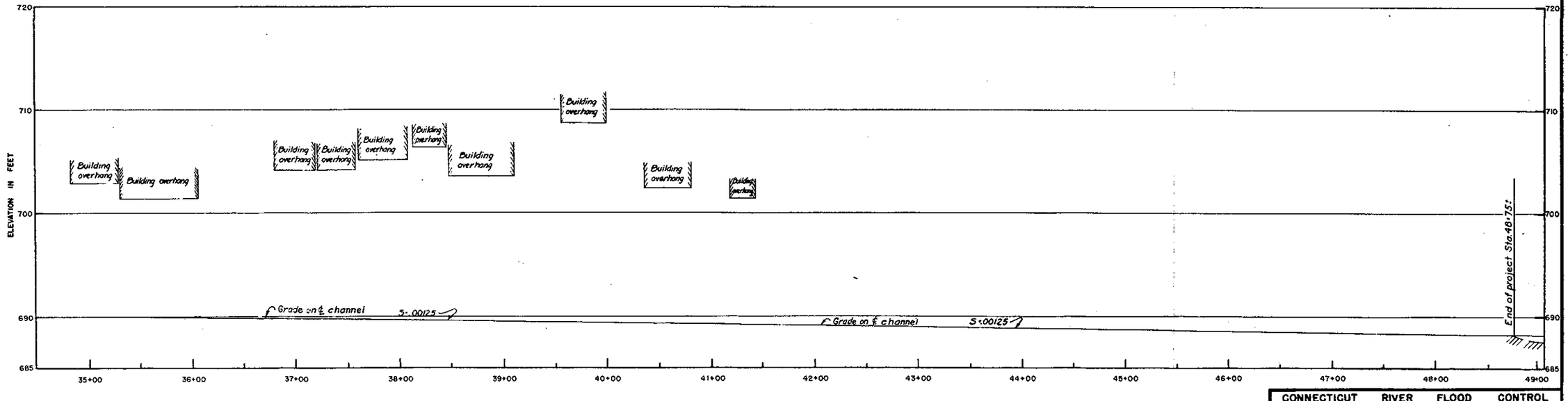
WAR DEPARTMENT

CORPS OF ENGINEERS, U. S. ARMY



PLAN

SCALE: 1" = 40'



PROFILE ALONG ℄ MAD RIVER

SCALE: HOR. 1"=40'
VERT. 1"=4'

NOTE

For general notes pertaining to this sheet see Sheet No. 2.

CONNECTICUT RIVER FLOOD CONTROL

CHANNEL IMPROVEMENT

WINSTED, CONNECTICUT

PLAN AND PROFILE NO. 4

MAD RIVER CONNECTICUT

SCALE: 1 IN. = 40 FT.

40 0 40 80'

OPERATION AND MAINTENANCE MANUAL

PREPARED BY

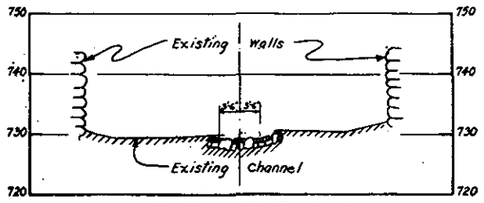
CORPS OF ENGINEERS U. S. ARMY

OFFICE OF THE DIVISION ENGINEER

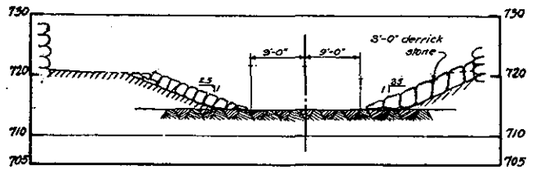
NEW ENGLAND DIVISION BOSTON, MASS.

JUNE 1953

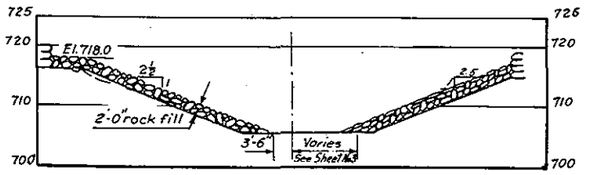
PLATE NO. VII



SECTION AT STA. 0+16

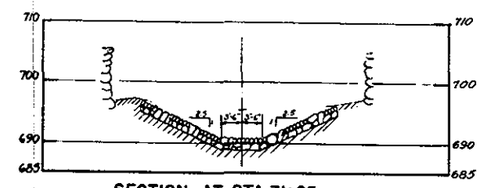


SECTION AT STA. 13+70.5

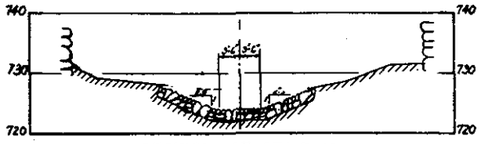


SECTION AT STA. 21+50

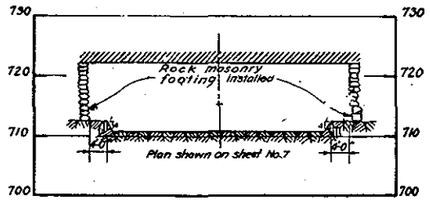
TYPICAL FROM STA. 20+01± TO STA. 22+25±



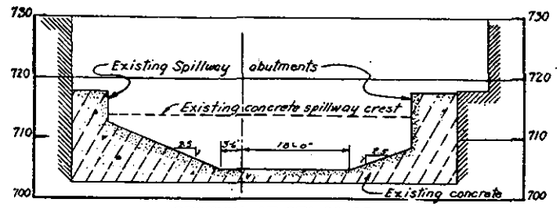
SECTION AT STA. 31+25



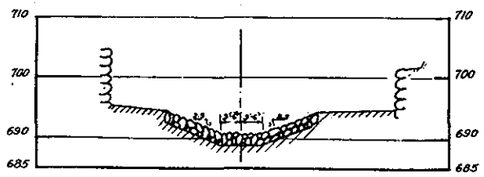
SECTION AT STA. 3+18



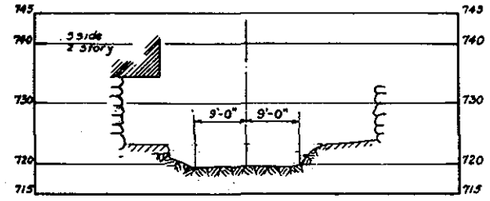
SECTION AT STA. 16+00



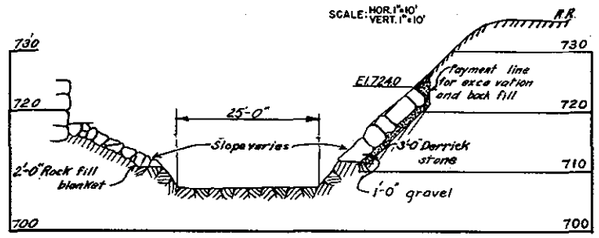
SECTION AT STA. 22+25



SECTION AT STA. 34+57

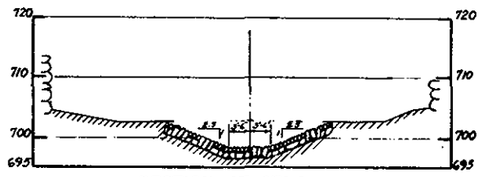


SECTION AT STA. 6+60

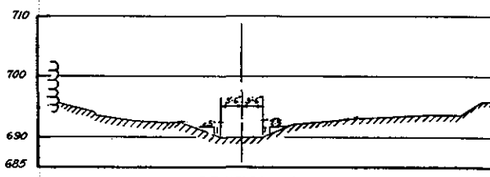


STA. 16+75±

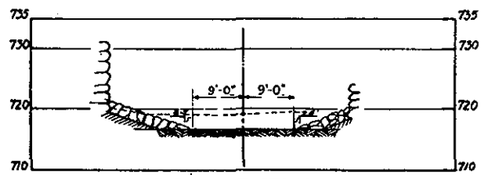
TYPICAL FROM STA. 16+32± TO STA. 16+85±



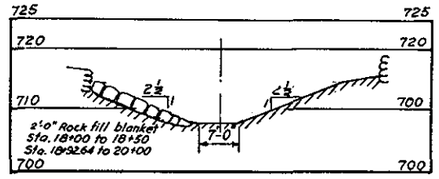
SECTION AT STA. 26+33



SECTION AT STA. 40+35

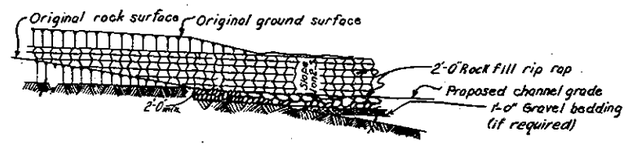


SECTION AT STA. 10+87



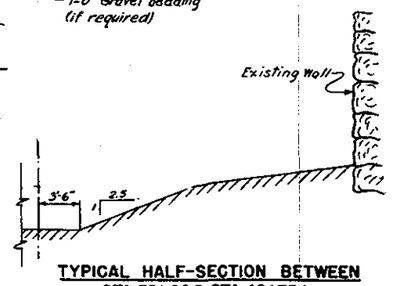
SECTION AT STA. 18+95.0

TYPICAL FROM STA 18+01± TO STA. 20+01±
(Except derrick stone Sta. 18+50 to Sta. 18+92.64 Left Bank)



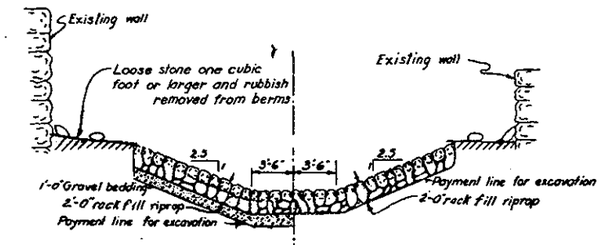
SECTION ALONG ℄ OF TYPICAL TRANSITION

SCALE: 1" = 10'



TYPICAL HALF-SECTION BETWEEN STA. 38+00 & STA. 48+75±

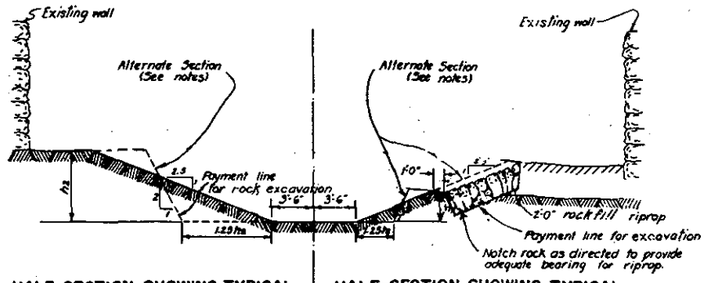
SCALE: 1" = 5'



HALF-SECTION SHOWING TYPICAL CONSTRUCTION IN EARTH WITH GRAVEL BEDDING

HALF-SECTION SHOWING TYPICAL CONSTRUCTON IN EARTH WITHOUT GRAVEL BEDDING

SCALE: 1" = 5'



HALF-SECTION SHOWING TYPICAL CONSTRUCTION IN ROCK

HALF-SECTION SHOWING TYPICAL CONSTRUCTION IN EARTH AND ROCK

SCALE: 1" = 5'

NOTES

For general notes pertaining to this sheet see sheet No.2.

Alternate sections shown for excavation in rock or in earth and rock shall be used between Sta. 3+60± and 5+10± and elsewhere where rock is encountered continuously for 150 feet or more. Transitions shall be effected in approximately 25 feet.

Area of cross section of Sta. 22+25 shall be not less than indicated. Final cross section to blend with channel above dam.

Subsurface explorations consist of probings only.

All rockfill riprap sections shall conform to typical sections as shown on this sheet.

CONNECTICUT RIVER FLOOD CONTROL

CHANNEL IMPROVEMENT

WINSTED, CONNECTICUT

CROSS SECTIONS

MAD RIVER — CONNECTICUT

SCALE: 1 IN. = 5 FT.

OPERATION AND MAINTENANCE MANUAL

PREPARED BY

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OFFICE OF THE DIVISION ENGINEER

NEW ENGLAND DIVISION BOSTON, MASS.

JUNE 1953

PLATE NO. VIII